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OAK RIDGE NATIONAL LABORATORY
CENTRAL FILES NUMBER
49-1-18

Date November 24, 1948

Subject Proposal for Cooperative Work on Oak Ridge Stack Problem

By H. C. Hodge

To H. A. Bädir

File

Those Eligible To Read The Attached

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C. N. Rucker

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## Remarks on Dr. Hodge's Memorandum

It is my impression that the proposed biological studies do not stress the most relevant questions. The dust problem here is not a bulk problem (of the sort encountered say in mining) but is a single particle problem. This fact seems to have escaped most of the medical people with whom I have talked, and judging from the first paragraph of #2 it seems not to be uppermost in the mind of Dr. Hodge. This point must be stressed again and again at Rochester.

Since the filters are now in place, I would be inclined to point almost entirely to the very fine particles, i.e., in #4, particles which pass GWS filters should be examined.

The one remaining problem, should the filters work as they now seem to, is the effect of the solid active deposit from radioactive gases. The Rochester people must be made aware of this, and they, or someone else, must get busy on this problem.

s/ A. M. Weinberg

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THE UNIVERSITY OF ROCHESTER
Atomic Energy Project

OAK RIDGE NATIONAL LABORATORY
CENTRAL FILES NUMBER
49-1-18

Intramural Correspondence

November 24, 1948
13

Memo to: Dr. Henry A. Blair

From: Dr. Harold C. Hodge

Subject: PROPOSAL FOR COOPERATIVE WORK ON OAK RIDGE STACK PROBLEM

At a meeting Wednesday, November 24, 1948, attended by Stokinger, Hursh, Spiegl, R. Wilson, F. Smith, Laskin, and Hodge, several suggestions were made as to specific work on the stack problem which could be accomplished in the near future, that is, within one or two months.

1. Additional Samples for Particle Characterization. As far as we are concerned, the samples Wilson obtained from the pile stack are satisfactory. We think the trip report submitted by Wilson, November 19, should be forwarded to Oak Ridge along with these suggestions. It should be stressed that Wilson's report is a trip report, not a progress report.

Samples of mist and "barium" operations. Apparently there are two other sources from which comparable exposures (to radioactive particulate matter) may arise: (a) a chemical mist in the processing of the slugs, and (b) a procedure known to us only because barium is involved. We offer to take samples of the atmosphere near these two operations, samples that will be comparable with the pile stack samples. We will be available on call with a week's notice. A red clearance is requested for Wilson to expedite his movement around Oak Ridge.

Size, Area, and Porosity. Particle-size measurements are being carried out (see Wilson's trip report) on the pile-stack dust. If area and porosity measurements are desired, bulk samples of dust are needed. These should be sent to Dr. Hursh with a description of the procedures and precautions used at Oak Ridge for handling such samples.

Elemental Analysis vs. Particle Size. The identification of the components of the dust as a function of particle size probably should be carried out at Oak Ridge. We might take additional Cascade Impactor samples which would be given to those laboratories at Oak Ridge equipped for analyses of the elements present.

Types of Radiation vs. Particle Size. The distribution of radioactivity (types of radiation) as a function of particle size may also best be done at Oak Ridge. We might take additional Cascade Impactor samples for this purpose.



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2. Biological Studies. If bulk dust samples were submitted by Oak Ridge, the study of the fate following intratracheal injection can be begun at once. Using rats, the distribution between lung and gastrointestinal tract with time as well as the appearance of radioactivity (and uranium) in the bone can be observed. This study would permit the rough evaluation of the relative importance of (a) ciliary and other "mechanical" means of removal of such a dust from the lung into the gastrointestinal tract, and (b) chemical solution and distribution throughout the body as factors in decreasing the content of dust in the lung following intratracheal instillation.

The question of aggregation of particulate matter in the lung can be answered in part by the study of histological sections of rat lungs following the intratracheal administration of dust. Particle-size distribution measurements will indicate whether aggregation plays an important role.

In an entirely separate study, the effect of single particles on single cells can be observed here by micromanipulation technics. Unless urgent, we would prefer to postpone this study for at least 6 months.

3. Inhalation of Large Particles. Determination of the probability of inhalation of large-sized particles, $\geq 10\ \mu$ for example, cannot be done without a great deal of preliminary work which might take about a year. Consequently, it is recommended that this work be deferred for the present because it may become apparent that this problem is relatively unimportant in relation to the problems posed by the smaller, easily inhaled particles shown from the Cascade Impactor sampling to be present.

4. Test Material. We would like to have suggestions from Oak Ridge as to what the best material is for this study. The choice of material might depend in part on the experimental program we have suggested. We would like to know how much material would be available. We would also appreciate receiving a statement recommending the precautions for use.

/s/ Harold C. Hodge